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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
09/237,229	01/26/99	KIM K	SEC.0584

IM22/0801

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EXAMINER	
MACARTHUR,S	
ART UNIT	**PAPER NUMBER**
1763	5

DATE MAILED: 08/01/00

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary	Application No. 09/237,229	Applicant(s) KIM ET AL.	
	Examiner Sylvia R MacArthur	Art Unit 1763	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).

Status

1)☐ Responsive to communication(s) filed on _____ .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-32 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-32 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claims _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are objected to by the Examiner.

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

a)☒ All b)☐ Some * c)☐ None of the CERTIFIED copies of the priority documents have been:

1.☒ received.

2.☐ received in Application No. (Series Code / Serial Number) _____ .

3.☐ received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. & 119(e).

Attachment(s)

15) ☒ Notice of References Cited (PTO-892)
16) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
17) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 3 .
18) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
19) ☐ Notice of Informal Patent Application (PTO-152)
20) ☐ Other:

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-3, 9, 17-22, 30, and 31 are rejected under 35 U.S.C. 102(b) as being anticipated by Imahashi (USP 5,695, 564).

Imahashi illustrates a multi-chamber type process system in Fig.1 wherein the basic units include process units U1, a transfer unit (transfer path) U2, a linear interconnection unit U3, and two-cassette (cassette stages) storing in/out unit U4. The units U1 to U8 are connected to each other through a gate valve GV functioning as an airtight joint and an opening/closing means.

Fig. 3 illustrates an extendible transfer arm 12 is provided in the casing 2 of the transfer unit U2, U6. The transfer arm 12 comprises arm 14a and 14b and a fork 16 coupled by a link mechanism. The transfer arm 12 is not only extended, but also vertically moved by a driving unit 18. An interconnection unit U3 is provided to connect the two transfer units U2, thereby forming a linear transfer path. One of wafer cassettes C of the in/out unit U4 is used to put non-processed wafers into the system and the other wafer cassette C is used to take out the processed wafers of the system.

Fig. 6 illustrates a plasma etching apparatus 71 used as process units U1, U5.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 4-8, 10-12,14-16, and 23-29 are rejected under under 35 U.S.C. 103(a) as obvious over Imahashi in view of Hiroki (USP 5,306,380).

Imahashi discloses interconnection units U7 wherein these units function to temporarily store the wafers between transfer units. He illustrates an extendible transfer arm 12 in Fig. 3.

The arm 12 comprises arm elements 14a and 14b and a fork 16 coupled by a link mechanism. A driving unit 18 not only extended but also vertically moves the arm,

An exhaust system 22 is connected to the interconnection unit U3. A position adjusting means for adjusting the position of the wafer W. After the etching process is completed, the wafer W is taken out of the etching unit U1a by the transfer arm 12 of the transfer unit U2a and transferred into the interconnection unit U3a.

It is not clear if the interconnection units are not load lock chambers. Hiroki provides load lock chambers provided with transfer arms.Hiroki discloses a vacuum process apparatus comprising three process chambers 3a, 3b, and 3c. Each of the process chambers in connected to a first load lock chamber via a gate valve 4. A second load lock 2 is connected to the first load lock 1 via another gate valve. A transfer member arranged under the air atmosphere is located to face the second load lock chamber. A retractable arm for transferring a substrate between each of the process

chambers and the second load lock chamber is arranged within the first load lock chamber. The gate valves 4 are capable of hermetically closing and opening the communication region.

A transfer member 6 is arranged outside lock chamber 2. Figure 1 shows the state that cassettes 5a and 5 are disposed on vertically movable tables. The transfer member 6 comprises 15a and 15b superposed one upon the other and a base 16 for rotatably supporting these arms. The two arms according to col. 4, lines 2-12 are able to transfer two substrates at a time from cassettes 5a and 5b.

Fig. 3 shows the driving system of base 9. The driving system comprises a cylinder 34, seal 38, bearings 42, and motors 54 and 56. Hiroki discusses the use of the apparatus in col. 6 lines 45-66. Hiroki cites that a computer can be used to control the movement of arm 7 (having the 3-arm arrangement see Fig. 6A). This arm would be used when the substrate S is moved by arm 7 from the process chambers 3a to the process chamber 3c. The motor and positioner 24 are provided to move or position in the direction desired (vertical, horizontal or otherwise).

It would have been obvious at the time of the claimed invention to provide the multichamber system of Imahashi with load lock chambers like those disclosed by Hiroki. These chambers are art-recognized modules as they provide stand-by areas for wafers to pass to and from the external environment while continuing to isolate the transfer modules from the external environment.

Regarding the specific design of the transfer arm, it would have been obvious to provide the multichamber system of Imahashi with the transfer mechanism of Hiroki.

Hiroki provides the system with a transfer mechanism with a plurality of transfer arms within the load lock chambers increases the throughout of wafers in the system.

5. Claims 13 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Imahashi in view of Hiroki (USP 5,306,380) as applied in paragraph # 4, in further view of Maydan (USP 4,951, 601).

The teachings of Imahashi and Hiroki were discussed above.

Both fail to teach providing the transfer arm with a vacuum line.

Maydan discloses a robot 80 comprising a removable base plate 88, blade assembly 84, and driving mechanisms 100 and 102 which are controlled by a controller/computer see cols. 5 and 6.

Maydan illustrates in Figs. 1 and 3, blade assembly 84 (transfer arm) which includes arm 104 and a replaceable metal blade or end effector 106 mounted thereto which has a circular pocket 108 for receiving a wafer 15 of a given size. Replaceable blades 106 having different sized pockets 108 can be used to hold different sized wafers. Blade 106 has holes 110--110 adjacent the outer end that are connected to a vacuum pump (not shown) by vacuum line 112, which are routed through the hollow inner shaft 98 (FIG. 2). Thus, blade 106 can operate as a vacuum pick, in which case the wafers are picked up at the end of the blade from cassettes 26 and 28 or deposited into the cassettes, in the external atmospheric pressure ambient.

It would have been obvious for one of ordinary skill in the art at time of the claimed invention to provide the transfer arms or Imahashi or Hiroki with a vacuum line,

to decrease the number of particles on the wafer-supporting surface and provide an improved chucking means for the transfer arm, as taught by Maydan.

Pertinent Subject Matter

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

   Ono et al (USP 5,527,390) discloses a treatment system including a plurality of treatment apparatus.

   Suda et al (USP 6,053,980) discloses a substrate processing apparatus comprising cassettes, load lock chambers, and process chambers.

   Edwards et al (USP 5,259,8810) discloses a wafer processing cluster tool 10 with one or more load locks.

Conclusion

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sylvia R MacArthur whose telephone number is 703-306-5690. The examiner can normally be reached on M-Th 6:30-4:00 1st and 3rd Fri. 6:30-3:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory L. Mills can be reached on 703-308-1633. The fax phone numbers for the organization where this application or proceeding is assigned are 703-305-3599 for regular communications and 703-305-3599 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

Sylvia R. MacArthur
July 28, 2000

GREGORY MILLS
PRIMARY EXAMINER